

## A NEW *JAPONICA* (LEPIDOPTERA: LYCAENIDAE: THECLINAE) FROM SOUTHWESTERN CHINA

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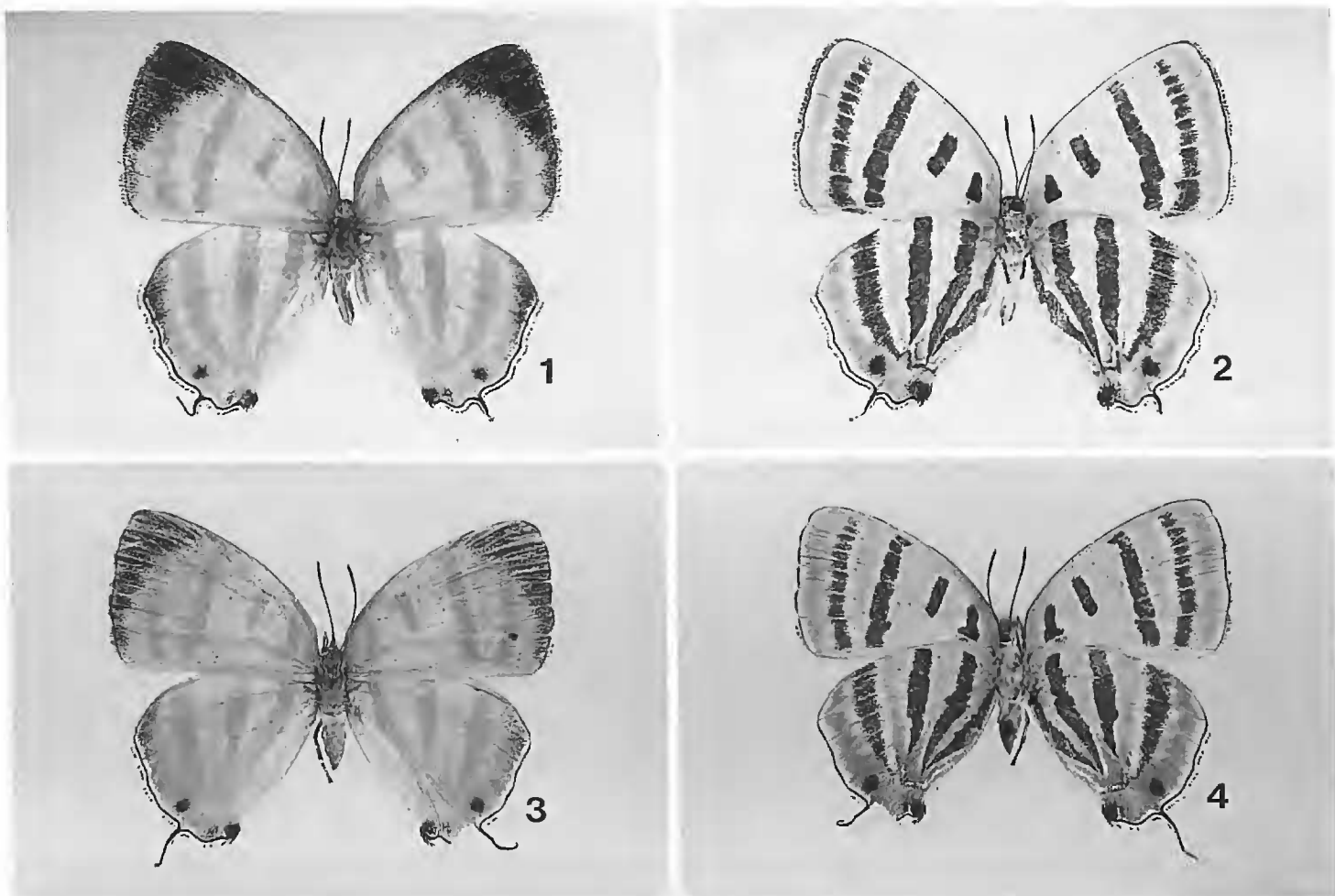
**Abstract.**—*Japonica bella* Hsu, NEW SPECIES, is described and illustrated based on material from Guizhou Province, southwestern China. The new species has an unusual brachium and papilla analis, both are unique to the genus *Japonica* and the rest of Theclini species and considered autapomorphies of *J. bella*. The discovery of the new species brings the number of species in genus *Japonica* to five.

**Key Words.**—Insecta, Lepidoptera, Lycaenidae, Theclini, China, *Japonica*

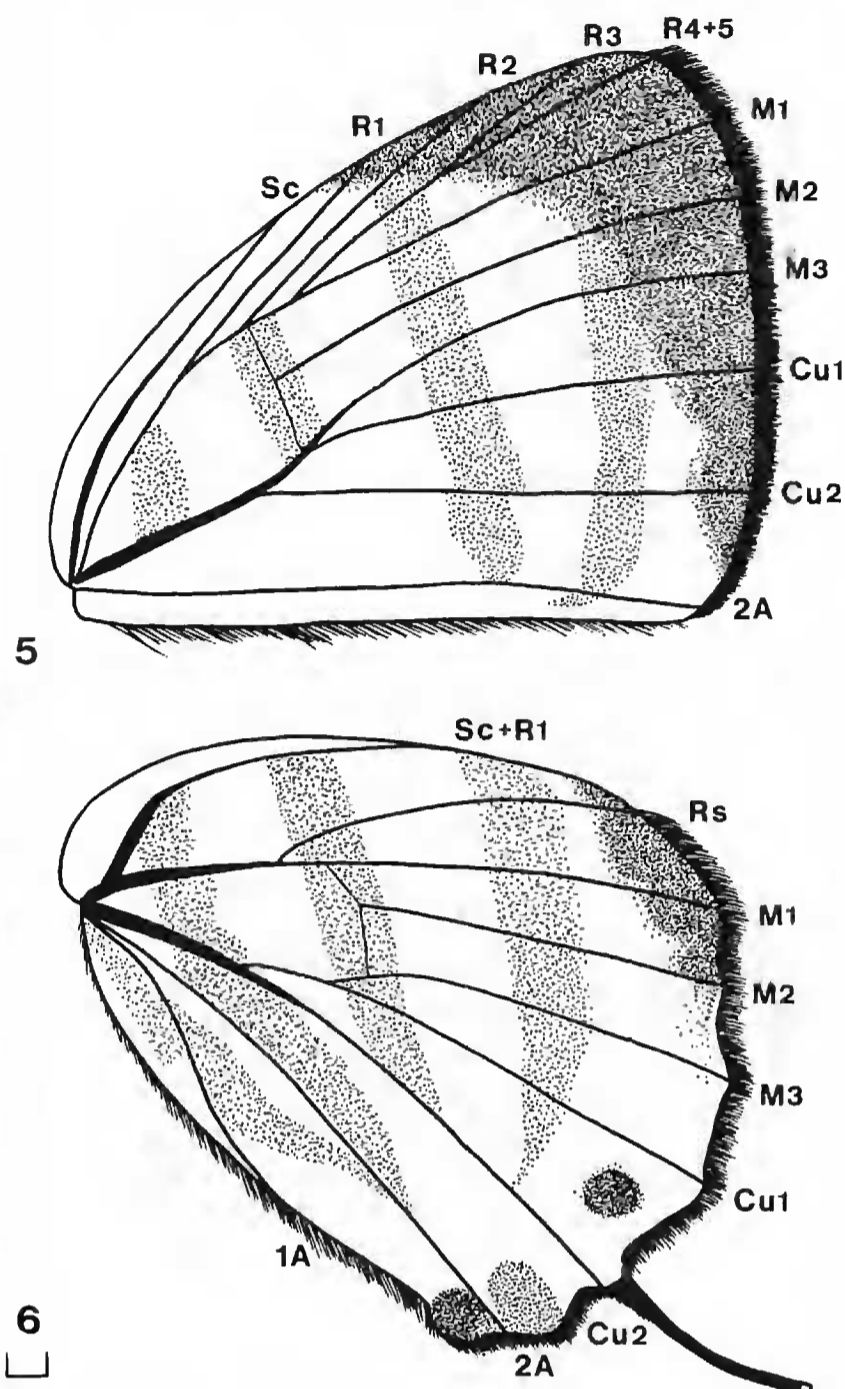
Theclini lycaenid butterflies of the genus *Japonica* generally inhabit oak forests in Old World temperate regions. The butterflies are active at twilight or during cloudy conditions (Fukuda et al. 1984). The members of *Japonica* have extensive orange scaling on the wings and possess many primitive characters (Shirôzu & Yamamoto 1956, Hsu & Lin 1994).

Fujioka (1993) recently reviewed the genus *Japonica* and recognized four species. He also reported the presence of a characteristic “vaginal membrane”, which is torn during copulation, on the ductus bursae in the female genitalia.

Life histories and host associations of all four *Japonica* species have been docu-



Figures 1–4. *Japonica bella* Hsu, NEW SPECIES. Fig. 1. Holotype male upperside. Fig. 2. Holotype male underside. Fig. 3. Paratype female upperside. Fig. 4. Paratype female underside.



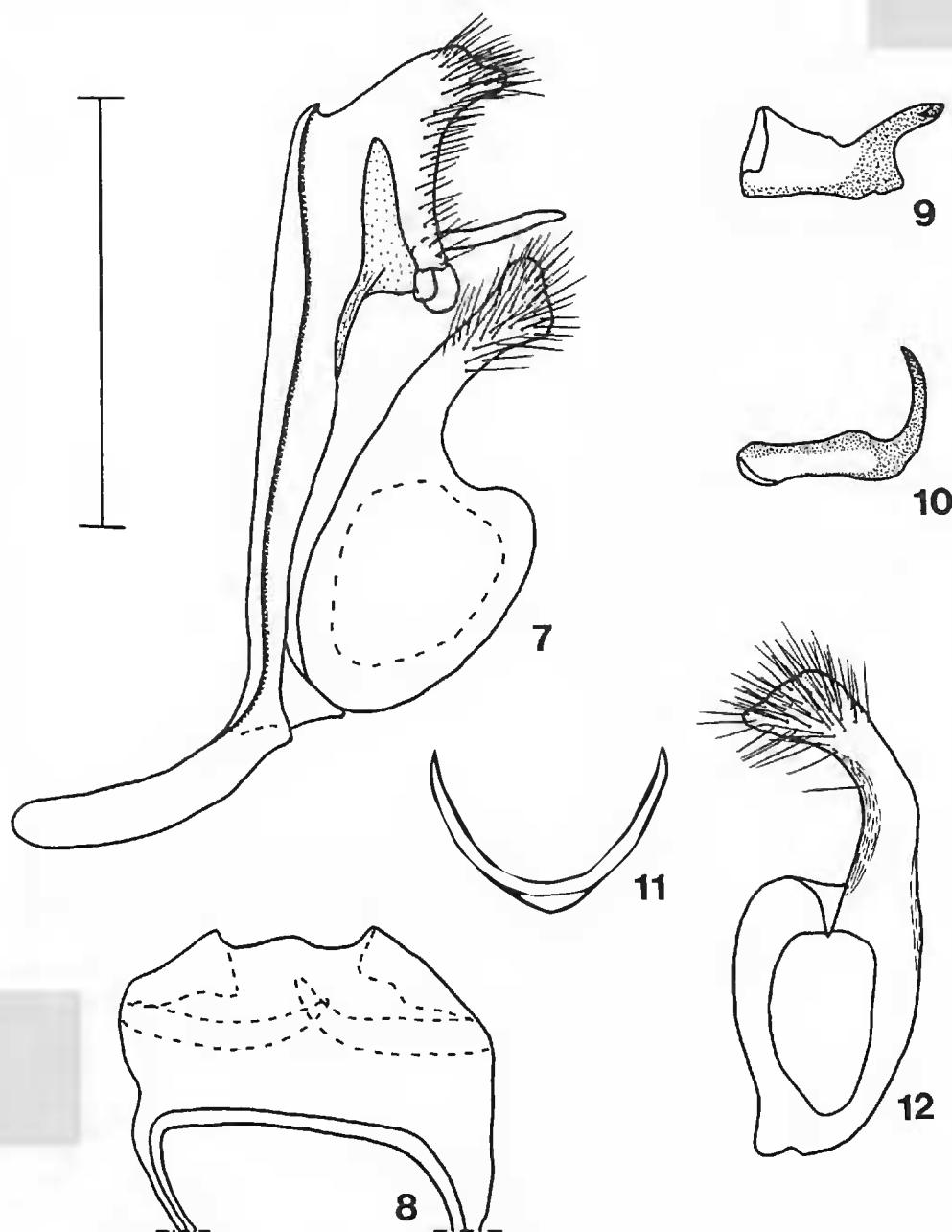
Figures 5–6. Venation of *Japonica bella*. Fig. 5. Forewing. Fig. 6. Hindwing (scale = 1 mm).

mented: larvae of *J. lutea* (Hewitson) utilize both deciduous and evergreen *Quercus* (Fagaceae) species in Japan (Shirôzu 1961) and deciduous *Q. mongolica* Fischeri in Far East Russia (Fujioka 1993); larvae of the closely related *J. adusta* (Riley) feed only on deciduous *Q. dentata* Thunberg in Japan (Inomata 1990) and Far East Russia (Fujioka 1993); larvae of *J. saepestriata* (Hewitson) are associated with deciduous *Quercus* species in most parts of Japan (Fukuda et al. 1984), except for a population in southern Ki-i Peninsula where evergreen *Q. phillyraeoides* Gray is utilized (Sai-gusa 1993); *J. patungkoanui* Murayama of Taiwan is known to use evergreen *Quercus stenophylloides* Hayata as the larval host (Uchida 1991).

According to Fujioka (1993), three of the four known *Japonica* species have been found in southwestern China. An undescribed species was recognized from the above region and is described here. This new species is distinct from the previously described species in wing pattern and genitalia of both sexes.

#### MATERIAL AND METHODS

Genitalic dissections were made by removing the entire abdomen, which was placed in 10% KOH at room temperature for 24 hours, then transferred to cellu-



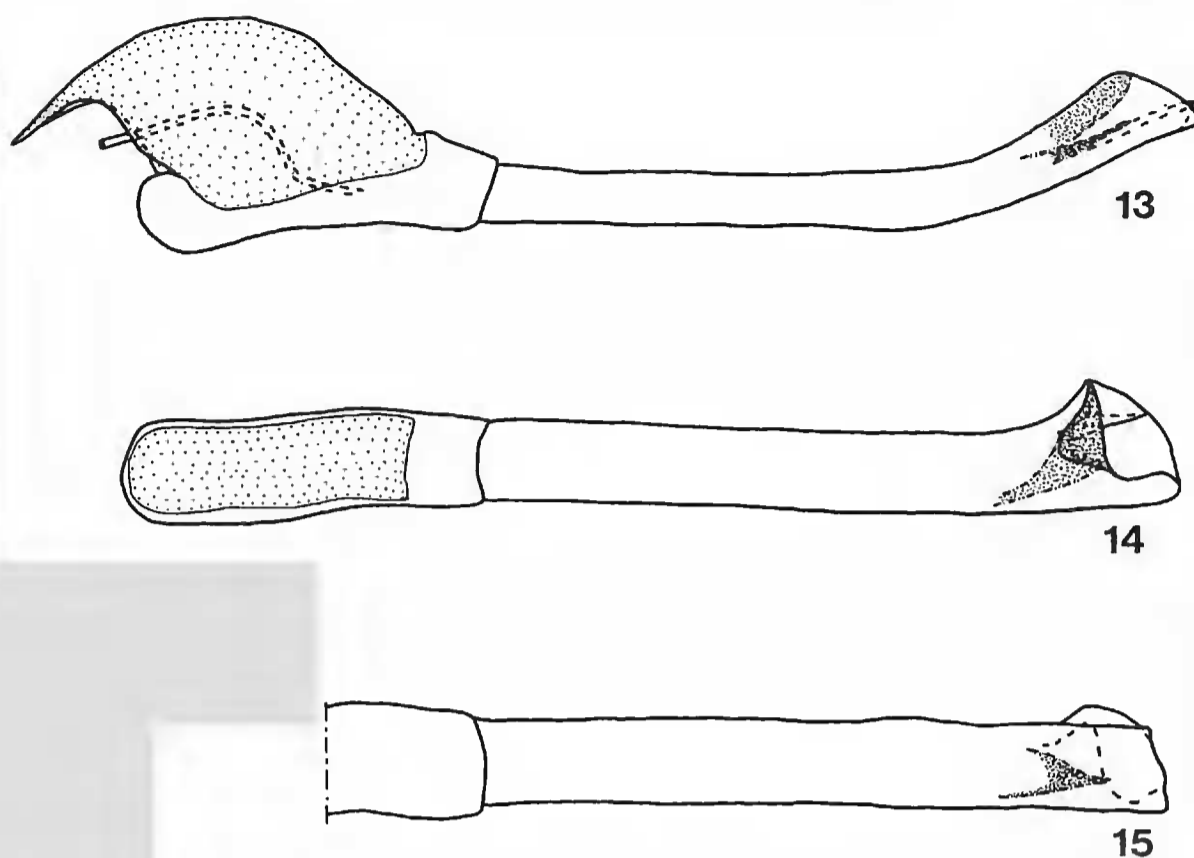
Figures 7–12. Male genitalia of *Japonica bella* excluding phallus. Fig. 7. Lateral view of sclerites of 9 + 10 genitalic segments with left brachium and valva attached. Fig. 8. Dorsum of sclerites of 9 + 10 genitalic segments. Fig. 9. Posterior view of left brachium. Fig. 10. Ventral view of left brachium. Fig. 11. Posterior view of juxta. Fig. 12. Dorsal view of left valva.

solve for another 24 hours for descaling, and finally placed in 70% ethyl alcohol for dissections. During examination, a few drops of xylene were placed on the wings to improve the contrast between veins and the covering scales.

*Japonica bella* Hsu, NEW SPECIES  
(Figs. 1–17)

*Types*.—Holotype, male; data: CHINA. GUIZHOU PROVINCE: Tongren Prefecture, Mt. Fanjing. 1000–1350 m, 18/19 Jun 1995; deposited: Zoological Institute, Academia Sinica, Beijing. Paratypes: same data as holotype, 4 males; deposited: Insect Museum, National Taiwan University, Taipei; California Academy of Sciences, San Francisco; 1 female; same locality as holotype, 23/24 Jun 1996; deposited: Zoological Institute, Academia Sinica, Beijing.

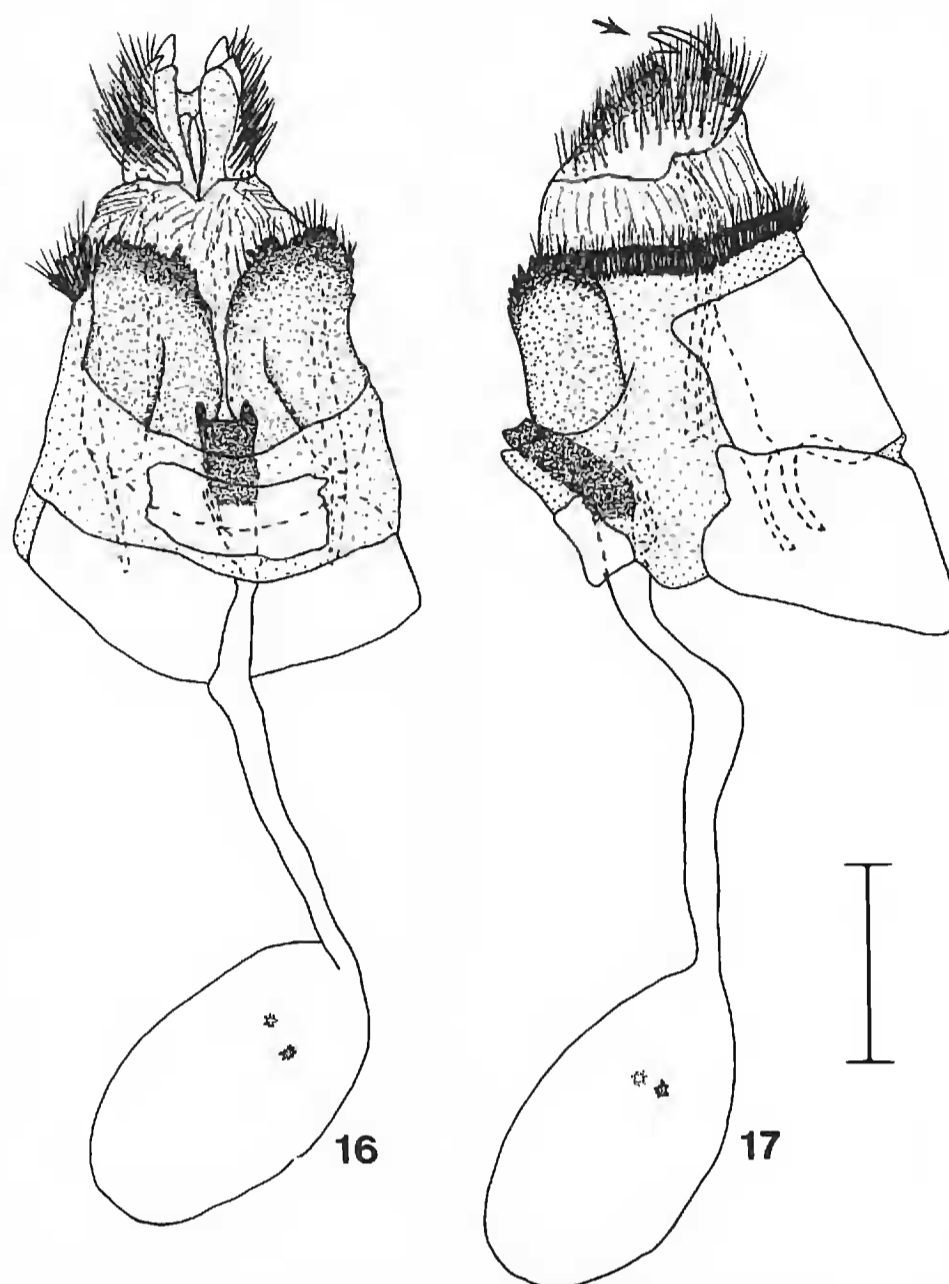
*Description*.—*Male* (Figs. 1–2). Length of forewing 17.0–19.2 mm (mean =  $17.96 \pm 0.84$  mm,  $n = 5$ ); Length of antenna 6.0–6.7 mm (mean =  $6.38 \pm 0.28$  mm,  $n = 5$ ). *Head*. Hairy, clothed with erect, dark brown hairs on vertex and frons, a white, narrow rim surrounding eye; eye semi-oval, sparsely hairy; labial palpus hairy, porrect, pointed, projecting ahead of plane of front; maxillary



Figures 13–15. Phallus of *Japonica bella*. Fig. 13. Lateral view of phallus. Fig. 14. Dorsal view of phallus. Fig. 15. Anterior portion of venter of phallus (scale = 1 mm).

reduced, invisible; proboscis unscaled; antenna smooth-scaled, with projecting setae at nudum. *Thorax*. Pale brown clothed with chrome orange scaling dorsally; white ventrally, legs white, banded with dark brown on tarsi. *Forewing*. Eleven veins, R4+5, M1 forked with R3 (Fig. 5); termen, costa curved; dorsum straight; ground color of upperside chrome-orange with underside markings visible by transparency, margin, apex black; underside ground color pale chrome-orange with dark brown markings. Submarginal band parallel to termen, outlined by white scaling proximally and distally, intersected by orange scaling along veins. Discal band straight, slightly tilted inwards, marking in Cu2 indented. Two bars present in discoidal cell: distal one rectangular, basal one triangular. Fringe dark brown. *Hindwing*. Nine separate veins (Fig. 6). Termen produced at distal ends of veins, forming zig-zag outline. Ground color of upperside chrome-orange with dark brown outline. A patch of black scaling present at anterior corner along termen. A small, black dot present near distal end of Cu1. Anal area slightly lobed, covered with metallic blue and black. Underside ground color chrome-orange with distal half darkened. Four transverse bands outlined with narrow, white lines; submarginal band sharply narrowed posteriorly, forming a slender "W"-shaped marking around tornal area. Tornal area bright orange, a distinct, black dot present in cell Cu1, a patch of black scaling mixed with metallic blue present at tornal lobe. Slender tail-like projection extending from Cu2, black with a white distal tip, approximately 6.5 mm in length. *Abdomen*. Chrome orange dorsally, white ventrally. *Male genitalia* (Figs. 7–15). Sclerites of 9th and 10th segments fused, forming a complete ring, width  $0.60 \times$  height. Tegumen 9 + 10 with dorsum fairly flat, slightly concave posteriorly with medial bump; uncus absent; socii folded deeply inwards; brachium double-articulated with tegumen, smooth, flattened, enlarged at base, abruptly narrowed, tapering to a posteriorly directed, hooklike process; saccus produced, approximately  $0.48 \times$  height of tegumen; phallus elongate, upcurved posteriorly, slightly asymmetrical with caudal end produced along right side; aedeagus  $1.95 \times$  phallobase; cornutus present, forming an elongate, triangular plate with sharp end near caudal end of aedeagus; valva semicircular with inward-curved, digitate posterior process ending with a terminal club; juxta narrow, U-shaped.

*Female* (Figs. 3–4).—Forewing length 16.0 mm ( $n = 1$ ); antennal length 6.0 mm ( $n = 1$ ). *Head*. and *Thorax*. Structure, color pattern as described for male. *Wings*. Shape similar to male, but with straight termen; color pattern as described for male. *Abdomen*. Color as described for male. *Female genitalia* (Figs. 16–17). Apophyses posteriores elongate, slender, down-curved, ending with club-shaped anterior ends. Papillae anales with terminal, heavily sclerotized, bifid processes. Apophyses anteriores short, with blunt terminal ends, approximately one-third  $\times$  length of apophyses posteriores. Sternite 8 divided, forming oval sclerites with posterior edges straight, serrate. Ductus bursae elongate,



Figures 16–17. Female genitalia of *Japonica bella*. Fig. 16. Ventral view. Fig. 17. Lateral view; arrow indicates the caudal processes at papilla analis (scale = 1 mm).

forming heavily sclerotized tube at the posterior end, with point of origin of ductus seminalis just anterior to the sclerotized tube. Corpus bursae oval, bearing a pair of small, flattened, amoeboid-shaped signa.

**Diagnosis.**—The pattern of four prominent bands or bars on the underside of the wings is unique among the species of *Japonica*. The enlarged brachium has a form not found in any members of the Theclini species. The caudal end of the valva is curved and clubed (Fig. 12) in *J. bella*, whereas it is straight and bifid in *J. saepestriata* and not clubed in *J. lutea*, *J. adusta*, and *J. patungkoanui*. The signa of *J. bella* are shallow and amoeboid-shaped, whereas those of the other *Japonica* species are invaginated and oval-shaped. The posterior edge of the sternite 8 is serrate, bearing numerous prominent teeth in *J. bella*, but smooth, without teeth in the other *Japonica* species. The terminal processes (Fig. 17) on papillae anales of *J. bella* are absent in the other *Japonica* members.

**Geographical Distribution.**—Currently only known from Guizhou Province, southwestern China.

**Etymology.**—An adjective of latin, from *bella* = beautiful.

**Discussion.**—The most unusual character found in *J. bella* is the enormously basally enlarged brachium, which is not present in the other members of *Japonica*. Hsu & Lin (1994) considered “smooth and simple” as the most plesiomorphic state for the shape of the brachium in the Theclini and assigned this state to the

genus *Japonica* in their phylogenetic analysis of a subgroup of Theclini. The discovery of *J. bella* could put such an assignment in jeopardy, but probably will not affect their overall decision on the polarity of character states in the shape of brachium in Theclini. The enlarged part of the brachium in *J. bella* is flattened along a plane perpendicular to the axis of the terminal narrow portion (Figs. 9–10). Such a form of enlargement is unique among members of Theclini and is clearly an autopomorphy of *J. bella*. The sole possession of bifid caudal processes in female genitalia of *J. bella* is evidently also an autopomorphy of *J. bella*.

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